

ART. VIII.—*Notes on the Structure of Asymmetron
bassanum, Günther.*

BY ETHEL REMFREY MORRIS, M.Sc.,

AND

JANET RAFF, B.Sc.

(Plates XVIII.—XX.).

[Read 8th July, 1909.]

Whilst working in the Biological Laboratory of the Melbourne University, our attention has been drawn to certain points in the structure of *Asymmetron bassanum*, which either have not hitherto been noticed, or have not been adequately described. This species is not uncommonly met with at depths up to twenty fathoms in certain rather restricted areas along the Victorian coast, and, as it is commonly employed in our laboratories in substitution for the genus *Amphioxus*, the description of which is given in all text-books, we have, at the suggestion of Professor Spencer, placed on record the following brief notes:—

1.—EXTERNAL STRUCTURE.

The average length of twelve specimens is 39 mm.; the average number of myotomes, 75; the average myotome formula, 44, 17, 14.

The ventral fin has chambers and fin rays, which are single (Fig. 4), but which may appear double when cut at certain angles (Fig. 9). The rostral fin is large.

At the anterior end there is always present an incomplete ring of pigment (Fig. 11), just in front of the first myotome.

The oral cirri are 24-26 in number, and bear sense papillae. The velum is placed at the level of the seventh myotome, and bears 16-18 tentacles.

The gonads are arranged in a single series on the right side, and vary in number from 25-30.

The left metapleur stops behind the atriopore; the right is continuous with the median ventral fin.

2.—PIGMENT RING.

A very marked feature of the species is the presence of an incomplete ring of pigment in the rostral fin. It is situated about .6350 mm. from the tip of the snout immediately in front of the first myotome, and is about .0635 mm. in thickness (Fig. 11). The pigment material lies in the cuticle, and extends dorsally and ventrally to varying distances in different specimens. In some of the sections examined the pigment was continued right over the dorsal surface, and stops short ventrally, thus forming an incomplete ring (Fig. 12). In others it did not extend over the whole dorsal surface, but continued further ventrally into the oral folds for a short distance. It is always present, however, as two thick bands on each side of the body, and varies only in its extension dorsally and ventrally. The olfactory pit and eye spot lie in the ring of pigment.

Pigment material is also developed in the different spaces in the body. In front of and in the region of the pigment ring it is thickly developed in the dorsal and ventral portions of the fin, and also in the spaces surrounding the notochord. Beyond the ring the pigment surrounds the nerve cord and notochord, and lines the dorsal fin space and the coelum. It runs down the right and left portions of the oral hood, where it is very thickly developed (Fig. 13).

3.—ATRIAL CAVITY.

At the anterior end of the body the atrial cavity forms a large space around the ventral and lateral regions of the pharynx. It extends backwards surrounding the alimentary canal, and separating the coelum from the body-wall, and opens to the exterior by means of the atriopore about two-thirds of the way down the body (Fig. 1). Beyond the atriopore the cavity is continued back (Fig. 2), and divides into two caeca surrounding the intestine, and separating the coelum

from the body wall, except on the ventral surface (Figs. 3 and 4). The left post-atrioporal caecum stops a short distance behind the atriopore (Fig. 5); the right is longer and extends almost to the anus (Fig. 6).

In Fig. 8 the relative lengths of the caeca and coelom are represented.

Taking the distance between the termination of the right atrioporal caecum and the anus as one, the following are the relative proportions:—

Between the atriopore and the posterior termination of the left atrial caecum—8.

Between the posterior termination of the left caecum and the posterior end of the right—20.5.

Between the end of the right caecum and the anus—1.

Extension of coelom behind the atriopore, i.e., to the anus—29.5.

4.—COELOM.

The coelom extends from the anterior end of the body to the anus. In the region of the pharynx it is much reduced by the atrial cavity being represented by paired cavities on its dorsal surface, with prolongations down the primary gill-bars communicating with the endostylar coelom on the ventral surface. Beyond the pharynx it is a small cavity surrounding the intestine, the atrium occupying the greater part of the space within the body wall. Just beyond the atriopore the coelom is still confined to a small space owing to the prolongation of the atrial cavity (Fig. 2), and becomes more spacious as the caeca die out (Figs. 3, 4, 5, 6), and ends in the region of the anus (Fig 7).

5.—CLASSIFICATION.

There is some uncertainty as to the position of *Asymmetron bassanum*. Miss J. W. Kirkaldy, in a paper in the Q.J.M.S., vol. xxxvii., divides the family *Branchiostomidae* into two genera—*Branchiostoma* and *Asymmetron*. The former she sub-divides into two sub-genera—*Amphioxus* and *Heteropleuron*—and classifies the species in question as *Heteropleuron bassanum*. But the chief features in the species—viz., the unilateral metapleural folds, and the single series of gonads, were found

to agree more closely with the characters of the genus *Asymmetron* than with those of the genus *Branchiostoma*, so a new classification was formed by W. M. Tattersall, B.Sc., in his paper in the Trans. Liverpool Biol. Soc., vol. xvii., where he places the species in the genus *Asymmetron*. He divides up the genus as follows:—

A.—Species in which a urostyle process is absent; oral cirri are present, and bear sense papillae; ventral fin is divided up into fin chambers; single post-atrional caecum.

(i) Ventral fin possesses both chambers and rays.

A. bassanum.

A. hectori.

A. maldivense.

A. cingalense.

(ii.) Ventral fin has fin chambers, but no rays.

A. cultellum.

B.—Species with a long urostyle process, into which the notochord is prolonged; oral cirri have no sense papillae; post-atrional caecum paired; ventral fin has neither fin rays nor chambers.

A. lucayanum.

A. caudatum.

From the description of the species we see there is a paired post-atrional caecum present, so we need to alter Tattersall's classification slightly, and arrange group A as follows:—

Genus Asymmetron.

A.—Species in which a urostyle process is absent; oral cirri are present, and bear sense papillae; ventral fin is divided up into fin chambers.

(i.) A single post-atrional caecum.

(a) Ventral fin possesses both chambers and rays.

A. hectori.

A. maldivense.

A. cingalense.

(b) Ventral fin has chambers but no rays.

A. cultellum.

(ii.) A paired post-atrional caecum.

A. bassanum.

EXPLANATION OF PLATES.

In all figures

B. C.	Coelom.
D. F. C.	Dorsal fin chambers.
E. S.	Eye spot.
F. S.	Fin space.
MY.	Myotome.
N. C.	Nerve cord.
NT.	Notochord.
O. C.	Oral cirri.
O. H.	Oral hood.
O. P.	Olfactory pit.
PI.	Pigment.
P. R.	Pigment ring.

PLATE XVIII.

- Fig. 1—Transverse section through region of atriopore, showing atrial cavity extending between coelom and body wall except in mid-dorsal region.
- „ 2-6—Transverse sections behind atriopore.
- „ 2—Atrial cavity still separating coelom from body wall except dorsally.
- „ 3—Atrial cavity divided into two caecae, right and left.
- „ 4—Showing right and left atrial caecae—the left close to its termination. Ventral fin ray also shown.
- „ 5—Left atrial caecum has disappeared completely.
- „ 6—Termination of right atrial caecum.
- „ 7—Transverse section through region of anus. Atrial cavity has completely disappeared.

PLATE XIX.

- Fig. 8—Diagrammatic longitudinal section showing (1) atriopore, (2) anus, (3) coelom extending posteriorly on either side as far as the anus, (4) right and left atrial caecae extending posteriorly between coelom and body wall.
- „ 9—Diagrammatic longitudinal horizontal sections of ventral fin rays cut at various angles.

PLATE XX.

- Fig. 10—Diagrammatic transverse section behind atriopore showing right and left atrial caecae as in Fig. 3.
,, 11—Anterior end showing incomplete ring of pigment around anterior end of notochord.
,, 12—Drawing compiled from a series of transverse sections through the pigment ring.
,, 13—Transverse section through oral hood showing pigment in spaces
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